

CLAIMS

1. An apparatus for processing a fluid sample comprising:
 - (i) a sample processing chamber comprising a fluid inlet and a fluid outlet;
 - (ii) a waste chamber downstream from the sample processing chamber and in fluid communication with the sample processing chamber fluid outlet and wherein the fluid communication between the sample processing chamber outlet and the waste chamber comprises a divergent analyte flow path;
 - (iii) at least two further chambers up stream from the sample processing chamber both of which are in fluid communication with the sample processing chamber fluid inlet;
 - (iv) a means for moving fluid from each of the at least two further chambers through the sample processing chamber and into the waste chamber or into the divergent analyte flow path as desired by applying positive or negative pressure to the desired flow path; and
 - (v) a passive means for restricting the flow of fluid.
2. An apparatus according to Claim 1 wherein the means for moving fluid from at least one of the at least two further chambers through the sample processing chamber comprises a means for generating a vacuum.

3. An apparatus according to Claim 2 wherein the waste chamber comprises an outlet port which is connected to the means for generating a vacuum.
4. An apparatus according to Claim 2 wherein the analyte flow path comprises an outlet port which is connected to the means for generating a vacuum.
5. An apparatus according to Claim 1 wherein the means for moving fluid from at least one of the at least two further chambers through the sample processing chamber comprises a plunger capable of being depressed to expel fluid from the at least one further chamber.
6. An apparatus according to Claim 5 wherein the means for moving fluid from at least one of the two further chambers through the sample processing chamber additionally comprises a means for generating a vacuum.
7. An apparatus according to any of Claims 1 to 6 wherein the means for moving fluid from each of the two further chambers through the sample processing chamber moves the fluid sequentially from the first at least two further chambers through the sample processing chamber and into the waste chamber and then from the second at least two further chambers through the sample processing chamber and into either the waste chamber or the divergent analyte flow path.

8. An apparatus according to any of Claims 1 to 7 wherein the passive means for restricting the flow of fluid comprises a valve located in the fluid communication between the sample processing chamber and the waste chamber.
9. An apparatus according to Claim 8 wherein the valve is down stream of the divergent analyte flow path.
10. An apparatus according to Claim 8 wherein the valve comprises a bead which is opened by applying a positive or negative pressure.
11. An apparatus according to any of Claims 1 to 10 wherein the passive means for restricting the flow of fluid comprises a reservoir located in the fluid communication between at least one of the at least two further chambers and the sample processing chamber.
12. An apparatus according to any of Claims 1 to 11 wherein the passive means for restricting the flow of fluid comprises a fluid pathway of small diameter such that fluid can not flow through the pathway without the application of a positive or negative pressure, located in the fluid communication between at least one of the at least two further chambers and the sample processing chamber.

13. An apparatus according to any of Claims 1 to 12 comprising a collection chamber downstream of the analyte flow path and in fluid communication with the analyte flow path outlet.
14. An apparatus according to Claim 13 wherein the collection chamber comprises a reagent, preferably a reagent comprising one or more nucleic acid amplification reagents, more preferably a reagent selected from the group consisting of nucleic acid primers, nucleic acid probes, fluorescing dyes, enzyme buffers, nucleotides, magnesium slats, bovine serum albumin, and denaturants.
15. An apparatus according to Claim 13 wherein collection chamber comprises an outlet port which optionally may be connected to a means for generating a vacuum.
16. An apparatus according to Claim 15 wherein the apparatus comprises a post processing chamber down stream from the collection chamber in fluid communication with the collection chamber outlet and which optionally itself comprises an outlet which may be connected to a means for generating a vacuum.
17. An apparatus according to any of Claims 1 to 16 wherein the sample processing chamber comprises an active member, preferably a trapping member selected from the group consisting of a microfluidic chip, a solid phase material, a filter, a filter stack, an affinity matrix, a magnetic separation matrix, a size exclusion column, a capillary tube, and mixtures thereof.

18. An apparatus according to Claim 17 wherein the sample processing chamber comprises a glass fibre filter membrane.

19. An apparatus according to any of Claims 1 to 18 wherein at least one of the at least two further chambers is pre-filled with a buffer solution, preferably a buffer solution selected from the group consisting of an aqueous solution of potassium acetate and Tris.hydrochloride, or an aqueous ethanolic solution of potassium acetate and Tris.hydrochloride.

20. An apparatus according to any of Claims 1 to 19 wherein at least one of the at least two further chambers acts as a sample chamber comprising an inlet port through which a sample is introduced into the apparatus.

21. An apparatus according to Claim 20 wherein the sample chamber inlet port comprises a filter membrane.

22. An apparatus according to any of Claims 20 to 21 wherein the sample chamber comprises a reagent, preferably a reagent comprising a lysis reagent, more preferably a chaotropic salt.

23. An apparatus according to any of Claims 1 to 22 wherein the apparatus comprises at least one chamber located externally to the main body of the apparatus.

24. An apparatus according to Claim 23 wherein the chamber located externally to the main body of the apparatus is the collection chamber.

25. An apparatus according to Claim 23 wherein the chamber located externally to the main body of the apparatus is at least one of the at least two further chambers.

26. An apparatus according to Claim 23 wherein at least one chamber located externally has walls which are coated with an electrically conducting polymer.

27. A method of processing a fluid sample comprising:

- (i) placing the sample in the sample processing chamber of an apparatus according to Claim 1;
- (ii) applying a positive or negative pressure to move fluid through the apparatus;
- (iii) subjecting the sample to one or more processing steps; and
- (iv) collecting the processed sample from the divergent analyte flow path .

28. Use of an apparatus according to Claim 1 for purification and concentration of nucleic acid material from a fluid sample.

29. Use according to Claim 28 wherein the nucleic acid material is then subjected to a polymerase chain reaction amplification.